Claims

1.   A DWDM network supporting first bit rate data streams, the DWDM network comprising:

- a plurality of network hubs interfacing to subscriber line connections, and

- a core hub for providing cross connections between the network hubs,

wherein each of the network hubs comprises a first bi-directional multiplexing unit arranged to multiplex n subscriber data streams each having a second bit rate which is substantially 1/nth of the first bit rate into a single first bit rate data stream for distribution on the DWDM network,

and wherein the core hub comprises:

- a plurality of second bi-directional multiplexing units each for de-multiplexing one of the single first bit rate data streams originating from the network hubs into the subscriber data streams and

- a switching unit arranged to selectively cross-connect the individual subscriber data streams back to individual ones of the second multiplexing units for distribution of the subscriber data streams to their respective destination network hubs in single first bit rate data streams each comprising n multiplexed subscriber data streams destined for the same network hub.

2.   A DWDM network as claimed in claim 1, wherein the subscriber data streams are 1 Gbit/s Gigabit Ethernet (GbE) data streams, and the first bit rate data streams are 2.488 Gbit/s SONET/SDH (OC48) data streams.

3.   A DWDM network as claimed in claim 1, wherein each of the first and second multiplexing units comprises a tagging unit for tagging each incoming subscriber data stream, and for allocating a wavelength to each outgoing subscriber data stream based on tags on the incoming first bit rate data stream.

4.   A DWDM network as claimed in claim 1, wherein the first and/or second multiplexing units each comprise a uni-directional multiplexing sub-unit and a uni-directional de-multiplexing sub-unit.

5. A DWDM network as claimed in claim 1, wherein each of the first multiplexing units and/or the second multiplexing units is incorporated in a Trunk Interface Card interfacing to the DWDM network.

6. A DWDM network as claimed in claim 1, wherein the switching unit is further arranged, in use, to selectively cross connect any m subscriber data streams originating from one or more of the network hubs of the DWDM network destined for any same one of a plurality of other network elements on a second network supporting third bit rate data steams, which are substantially a multiple m of the first bit rate, to one of a plurality of third multiplexing units of the core hub for multiplexing into a single third bit rate data stream for distribution to the same other network element.

7. A DWDM network as claimed in claim 6, wherein the third bit rate is substantially equal to the first bit rate.

8. A DWDM network as claimed in claim 7, wherein the third bit rate data streams are 2.488 Gbit OC48 data streams.

9. A DWDM network as claimed in claim 1, wherein each of the first and second multiplexing units comprises a 2xGbE/OC48 Packet Over SONET (POS) multiplexer unit.

10. A DWDM network as claimed in claim 1, wherein each multiplexing unit may comprise a SONET time division multiplexing (TDM) multiplexer unit.

11. A DWDM network as claimed in claim 10, wherein the SONET TDM multiplexer units are arranged, in use, to first decode 1.25 Gbit/s 8b/10b encoded GbE streams to produce two 1 Gbit/s streams, and to then multiplex the two 1 Gbit/s streams into SONET Virtual Containers.

12. A DWDM network as claimed in claim 10, wherein the SONET TDM multiplexer units are arranged, in use, to first decode the 1.25 Gbit/s 8b/10b encoded GbE streams to produce two 1 Gbit/s streams, and to then multiplex the two 1 Gbit/s streams into a SONET frame in alternate time slots.

13. A DWDM network as claimed in claim 12, wherein the SONET TDM multiplexer units are arranged in a manner such that, in use, additional filler bytes are being inserted to match to the capacity of the SONET frame.

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14. A DWDM network as claimed in claim 10, wherein the SONET TDM multiplexer units are further arranged in a manner such that, in use, the decoded GbE streams are being re-encoded utilising a 5b/6b line code to produce 1.2 Gbit/s streams, before employing the multiplexing into the 2.488 Gbit/s OC 48 data streams.

15. A core hub for providing cross connections between network hubs interfacing to subscriber line connections, the core hub comprising:

- a plurality of bi-directional multiplexing units each for de-multiplexing one first bit rate data stream originating from one of the network hubs into n subscriber data streams having a bit rate which is substantially 1/nth of the first bit rate, and

- a switching unit arranged to selectively cross-connect the individual subscriber data streams back to individual ones of the multiplexing units for distribution of the subscriber data streams to their respective destination network hubs in single first bit rate data streams each comprising n multiplexed subscriber data streams destined for the same network hub.

16. A core hub as claimed in claim 15, wherein the subscriber data streams are 1 Gbit/s Gigabit Ethernet (GbE) data streams, and the first bit rate data streams are 2.488 Gbit/s SONET/SDH (OC48) data streams.

17. A core hub as claimed in claim 15, wherein each of the multiplexing units comprises a tagging unit for tagging each incoming subscriber data stream, and for allocating a wavelength to each outgoing subscriber data stream based on tags on the incoming first bit rate data stream.

18. A core hub as claimed in claim 15, wherein the multiplexing units may each comprise a uni-directional multiplexing sub-unit and a uni-directional de-multiplexing sub-unit.

19. A core hub as claimed in claim 15, wherein each of the multiplexing units is incorporated in a Trunk Interface Card interfacing to the DWDM network.

20. A core hub as claimed in claim 15, wherein The switching unit is further arranged, in use, to selectively cross connect any m subscriber data streams originating from one or more of the network hubs of the DWDM network destined for any same one of a plurality of other network elements on a second network supporting third bit rate data steams, which are substantially a multiple m of the first bit rate, to one of a plurality of third multiplexing units of

the core hub for multiplexing into a single third bit rate data stream for distribution to the same other network element.

21.   A core hub as claimed in claim 20, wherein the third bit rate is substantially equal to the first bit rate.

22.   A core hub as claimed in claim 21, wherein the third bit rate data streams are 2.488 Gbit OC48 data streams.

23.   A method of distributing data on a DWDM network supporting first bit rate data streams, the DWDM network comprising a plurality of network hubs interfacing to subscriber line connections and a core hub for providing cross connections between the network hubs, the method comprising the steps of:

- at each network hub multiplexing n subscriber data streams each having a second bit rate which is substantially 1/nth of the first bit rate into a single first bit rate data stream for distribution on the DWDM network,

- at the core hub de-multiplexing the single first bit rate data streams originating from the network hubs into the subscriber data streams, and

- at the core hub multiplexing any n subscriber data streams into a single first bit rate data stream for distribution to a same one of the network hubs.

24.   A method as claimed in claim 23, wherein the subscriber data streams are 1 Gbit/s Gigabit Ethernet (GbE) data streams, and the first bit rate data streams are 2.488 Gbit/s SONET/SDH (OC48) data streams.

25.   A method as claimed in claim 23, wherein the method comprises the steps of at the network hubs and the core hub tagging each incoming subscriber data stream, and allocating a wavelength to each outgoing subscriber data stream based on tags on the incoming first bit rate data stream.

26.   A method as claimed in claim 23, wherein the method may further comprise the steps of at the core hub selectively cross connecting any m subscriber data streams originating from one or more of the network hubs of the DWDM network destined for any same one of a plurality of other network elements on a second network supporting third bit rate data steams, which are substantially a multiple m of the first bit rate, to one of a plurality of third

multiplexing units of the core hub for multiplexing into a single third bit rate data stream for distribution to the same other network element.

27.   A method as claimed in claim 26, wherein the third bit rate is substantially equal to the first bit rate.

28.   A method as claimed in claim 27, wherein the third bit rate data streams are 2.488 Gbit OC48 data streams.